INPUT

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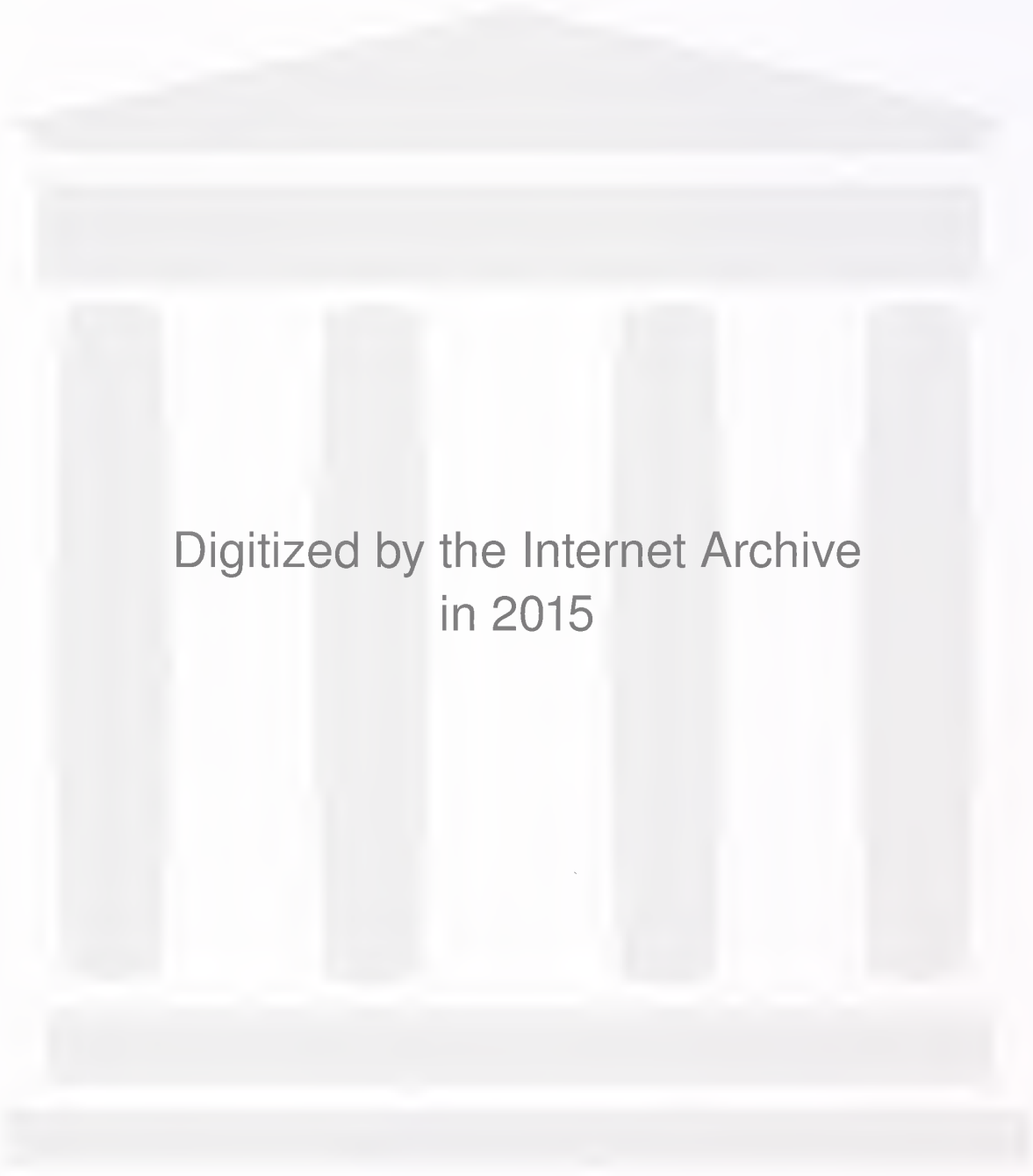
LSI LOGIC OPERATIONAL SYSTEMS ASSESSMENT

Executive Presentation

Prepared by
INPUT

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300



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Overview

- Objectives
- Methodology
- Management View - Current Environment
- LSI compared to other firms
- Conclusions and recommendations
- Long Term Direction
- Next steps

Study Objectives

- Assess current operational systems environment
- Examine LSI's position vis-a-vis its competitors
- Recommend target long range environment
- Recommend outside resources - next steps

Methodology

- Management meeting to finalize objectives/approach
- Three interview guides developed
- 24 Interviews conducted with LSI user management
  (11 Operating Units including MIS)
- 8 Interviews conducted with industry peers
- Analysis performed on results of the interviews

Competitor Interviews

- Advanced Micro Devices
- Applied Materials Corporation
- Hewlett Packard
- Intel Corporation
- National Semiconductor
- SUN Microsystems
- Tandem Computers
- Ratheon

Management View - Current Environment

Key areas analyzed in the LSI user survey:

- Systems criticality
- COLSIS
- LSI's systems management processes
- End-user systems priorities

Systems Criticality

COLSIS - The key integrator and critical system

Operational System	#(1) Mentions
COLSIS	11
Financial Packages	7
MAESTRO	5
PROMIS	4
LLAMDAA	3
LPROF/CPROJ	2

(1) - Number of mentions out of 11 operating divisions

COLSIS

- Right selection at the time
  - Probably least costly
  - Shortest time to implementation
- Implementation painful
  - Forced change in business practices
  - Increased workload for some transactions
  - Training and documentation weak
- Underlying issues
  - COLSIS discipline counter to LSI culture
  - Interfaces unfriendly for management users

Systems Management Processes
User Quality Assessment

Quality Level	Management Process
High	Systems maintenance (Applications)
Medium	Systems planning - Short range Systems development Installation and testing General communications Quality assurance
Low	Systems planning - Long range User training Post installation assessment User involvement

User Priorities for Information Systems

Systems Need	Number Mentions
Worldwide integration of systems	6
End-user management tools	6
Graphical user interfaces	6
Improved LR planning processes	5
Code and process standards	4
Tighter integration - factory systems	3
Product/Service margin reporting	3
Improved documentation/training	3
Electronic data interchange	2

LSI Compared to Other Firms

- Systems architecture
- New technology deployment
- Use of outside software/services
- Quality of systems management processes
- Systems priorities
- Degree of centralization
- Expenditures

Systems Architecture Competitors

Architectural Characteristic	Number Mentions
Major Platform	
Primarily mainframe	2
Mix of mainframe and midrange	4
Mostly midrange	1
PC/Workstation applications	
Office systems (PCs/DOS/Windows)	8
Office systems (UNIX)	3
Client server under study or pilot	5
Client server in production	1

* Average rating on a scale of 1 - 5 with 1 indicating little or no interest/investment, 5 indicating high level

LSI

- Comparable in terms of hardware mix
- Behind on use of downsizing technology

Investment/Interest of Competitors In New Technology

Technology	Average Rating*
Relational database management systems	4.1
Local area network based applications	4.0
CASE (Computer aided systems engr.)	3.4
Client server architectures	3.0

LSI

- Behind competitors in all areas (business apps)
- Relational database is critical

Use of Outside Software And Services

- Use of outside software within LSI is comparable to that of competitive firms surveyed.
- LSI's use of outside services is less than the sample group's.
- Budgeted expenditures of outside services averages less than the 18% identified for the firms in the survey.
- *Outsourcing* has or is being examined by 6 of the firms in the group.
  - One firm actively looking
  - One firm rejected outsourcing - costs too high
  - One firm has established "internal" outsourcing function

Quality of Systems Management Processes

Systems Management Process	LSI	*
Overall quality of business systems	M/L	M
Operational integrity of network	M	H
Maintenance of existing systems	H	H
Development of new systems	M	M
Communications with IS	M/L	M/H
Long range systems planning	L	M
Short term systems planning	M	M
Training and end-user support	L	M

* Average of survey sample response.

H = High quality
M = Acceptable quality
L = Below acceptable quality

Top Systems Priorities LSI's Competitors

Systems Need	Number Mentions
Downsizing/distributing applications	11
Improving user access to info	6
Re-engineering (apps and network)	5
Greater use of outside capabilities	4
Increased use of CASE technology	3

Key differences between LSI and competitors:

- Heavy emphasis by competitors on downsizing
- Growing interest in looking outside for solutions

Centralization of Competitors' Management Activities

Systems Activity	Average Rating*
Long range architectural planning	4.5
Long range applications planning	3.9
Operations	3.4
Applications development	3.1

* Average rating of sample firms on a scale of 1 - 5 with 1 representing decentralization and 5 centralization

Systems Expenditures

Systems Expenditures

- Sample indicates and average expenditure of 2.8% of revenue
- Average outside expenditures for software and services represent 18% of systems budget
- R&D expenditures average 150% of operational systems expenditures. (Vary between 100% and 200%)

Conclusions

- LSI's expenditures for operational systems based on % of revenue are in line, if not lower than the sample average.
- LSI's expenditures for outside services are lower as a % of budget than the sample average.

Conclusions & Recommendations

- Current operational systems
- Architecture
- Outsourcing
- Customer service/end-user support
- Systems management processes
- Computer operations

Current Operational Systems

While difficult to live with COLSIS provides a core around which continued evolution can proceed.

- It provides an effective repository for key operational information.
- It provides higher data integrity than previously available
- It lacks the user interfaces and end-user tools to make it useful for decision support and other ad hoc applications.

RECOMMENDATIONS

- Proceed with European implementation.
- Implement end-user computing strategy to solve interface and ease of use problems.
- Make COLSIS the focus of long range systems planning.

Current Operational Systems

The PROMIS study is well underway, and there are outside pressures to move ahead with an upgrade as quickly as possible. Results of the study indicate that this decision should be made carefully.

- INPUT suspects that manufacturing executive management is not as directly involved as it should be.
- The outside survey indicated that at least six other firms are using *Consilium* to provide the equivalent of PROMIS and MAESTRO capability.

RECOMMENDATIONS

- If not already underway, consideration should be given to an evaluation of *Consilium*.
- Manufacturing (not MIS) needs to take charge of a project to insure that uniform standards are developed in terms of codes, process definitions, etc.

Architecture

The current systems are implemented in an aging architecture and no long term plan for network and platform environments currently exists.

- IMS, the COLSIS data base environment is inadequate to support user developed management information and decision support systems.
- The outside survey suggests a strong move toward relational databases and distributed systems.

RECOMMENDATIONS

- Build a system to extract data from existing databases and put it into relational form to meet management query, decision support and management reporting needs.
- Supply the necessary tools and support through an end-user computing function.
- Consider, as part of long range planning, migration of COLSIS and other operational systems to a common relational database.

Outsourcing

There are clearly opportunities for LSI to outsource parts of its operational systems environment. However, ...

- Without a long range plan LSI is at a disadvantage in terms of negotiating an agreement which is likely to accommodate its long term needs at a reasonable cost.
- With no plan in place the outsourcing firm's plan could become LSI's plan.

RECOMMENDATIONS

- Jump start a long range planning process which would provide the information to intelligently approach an outsourcing strategy.
- Alternatively consider outsourcing the existing environment and focusing internally on developing a re-engineered applications suite to meet long term needs.

Customer Service/End-User Support

From an end-user (internal customer) viewpoint, MIS lacks a service and support orientation. This problem is amplified by the fact that...

- MIS is organized to provide implementation services, not on-going support.
- The split in responsibility between MIS and Integrated Silicon Engineering with regard to operations confuses users.

RECOMMENDATIONS

- Create and end-user support function within MIS to provide both executive/decision support services and on-going help desk and other services to all customers.
- Revamp training practices and improve documentation to reduce user dependence on direct technical support.

Systems Management Processes

LSI is lacks a long range systems planning process to address end-user needs and priorities. The existing plan addresses only the integration of the current systems environment. The current plan fails to address:

- The development of company operating philosophies upon which systems strategy can be developed.
- The integration of new technologies.
- Longer term migration strategies for networks and database environments.
- Standardization on key technologies for end-user management information systems.

RECOMMENDATIONS

- Initiate a long range systems planning process which will address technology, organizational, standardization and the migration strategies required.

Computer Operations

Computer operations is currently managed by Integrated Silicon Engineering, and user support is provided out of this organization as well as MIS to end users. The survey results conclude that:

- Some users are confused as to which organization provides what types of support.
- European users are concerned about support on off-shifts and weekends as their systems become integrated and are run on the California facility.

RECOMMENDATIONS

- Support functions should be consolidated under MIS regardless of who actually manages computer and network operations.
- If not already underway, operations needs to conduct a study to determine support, staffing, and disaster recovery requirements for a twenty-four hour/seven day per week scenario.

Long Term Systems Direction

- Strong centralized planning processes and coordination of standards
- Centralized management of operations and data administration (even though the ultimate form of LSI's operational network might well be distributed)
- Decentralized management (over time) of applications development activities unique to individual operating divisions.
- Direct end-user executive involvement in project management and standards development.
- A progressive, but not "bleeding edge", approach to the opportunities that new technology will bring
- A conscious strategy to make users self-sufficient within the context of reasonable standards and discipline

Next Steps

Action Items/Next Steps	Priority H/M/L	Out. ✓
Communicate study results	H	✓
Install long range planning process	H	✓
Create long range systems plan	H	
Create end-user support/service function	H	✓
Initiate manufacturing standards project	H	
Develop end-user architecture	H	✓
Implement MIS organization	M	✓
Prepare outsourcing strategy	M	✓

Column 2: Priority (H=High, M=Medium, L=Low)
Column 3: Candidate for outside consultation/support

About INPUT

INPUT provides planning information, analysis, and recommendations for the information technology industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

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INPUT OFFICES

North America

San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300 Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
Tel. (201) 801-0050 Fax (201) 801-0441

Washington, D.C.
INPUT, INC.
1953 Gallows Road, Suite 560
Vienna, VA 22182
Tel. (703) 847-6870 Fax (703) 847-6872

International

London
INPUT LTD.
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

Paris
INPUT SARL
24, avenue du Recteur Poincaré
75016 Paris, France
Tel. (1) 46 47 65 65 Fax (1) 46 47 69 50

Frankfurt
INPUT LTD.
Sudetenstrasse 9
W-6306 Langgöns-Niederkleen, Germany
Tel. 0 6447-7229 Fax 0 6447-7327

Tokyo
INPUT KK
Saida Building, 4-6
Kanda Sakuma-cho, Chiyoda-ku
Tokyo 101, Japan
Tel. (03) 3864-0531 Fax (03) 3864-4114